REMARKS

Entry of this Amendment is proper because it narrows the issues on appeal and does not require further searching by the Examiner.

Claims 1-25 are all the claims presently pending in the application. Claims 1-5, 7 and 23-25 have been amended to more particularly define the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claim 23 stands rejected under 35 U.S.C. § 112, second paragraph as being allegedly indefinite. Applicant notes that claim 23 has been amended to address the Examiner's concerns. Thus, Applicant submits that claim 23 is not indefinite and respectfully requests that the Examiner withdraw this rejection.

Claims 1-6, 8-16 and 19-22 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Taylor et al. (Adaptive Image Compression for Wireless Multimedia Communication, IEEE International Conference on Communications, Vol. 6, 11-14, June 2001, pp1925-1929). Claims 7 and 17 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Taylor in view of Kuniba (US Patent 6,697,529).

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Taylor in view of Yovanof et al. (US Patent 5,677,689). Claims 23-25 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Taylor in view of Maeda (US Patent 6,067,382).

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

An exemplary aspect of the claimed invention (e.g., as recited in claim 1) is directed to an image compression method for compressing image data which includes storing compression characteristics data indicating compression characteristics of plural images having plural complexities, acquiring an initial compression parameter, performing a compression process on image data of an image to be compressed based on the initial

compression parameter, acquiring a corrective compression parameter, and performing another compression process on image data of an image to be compressed based on the corrective compression parameter. The compression characteristics include a relationship between a bit rate, which is a ratio between data volume and the number of pixels of image data, and a compression parameter associated with image quality and compression rate, and acquiring an initial compression parameter acquires the initial compression parameter based on the compression characteristics data of an average image and a target bit rate.

Importantly, acquiring the corrective compression parameter includes acquiring from among the plural complexities a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter, and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of the image to be compressed and the target bit rate, and the initial and corrective compression parameters include a Q-value (Application at page 1, lines 17-20; page 13, line 10-page 15, line 4; Figures 3 and 4).

A conventional method includes acquiring image data having a predetermined data volume based on a data volume acquired through a pre-compression process on image data in a sampling area set in a certain position on a screen. However, this inevitably results in an increased processing time (Application a page 3, line 24-page 4, line 6).

In the claimed invention, on the other hand, acquiring the corrective compression parameter includes acquiring from among the plural complexities a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter, and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of the image to be compressed and the target bit rate the initial and corrective compression parameters include a Q-value (Application at page 1, lines 17-20; page 13, line 10-page 15, line 4; Figures 3 and 4).

II. THE ALLEGED PRIOR ART REFERENCES

A. Taylor

The Examiner alleges that Taylor anticipates the invention of claims 1-6, 8-16 and 19-22. Applicant submits, however, that there are features of the claimed invention that are not taught or suggested by Taylor.

Taylor discloses the results of varying some image compression parameters on energy dissipation, bandwidth required, and quality of image received (Taylor at Abstract).

However, Applicant submits that Taylor does not teach or suggest "*wherein said acquiring said corrective compression parameter includes: acquiring from among said plural complexities, a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing said compression process, and said initial compression parameter; and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of said image to be compressed and the target bit rate, and wherein said initial and corrective compression parameters comprise a Q-value* ", as recited, for example, in claim 1 (Application at Figures 3 and 4; page 13, line 10-page 15, line 4). As noted above, this may help to allow a compression process to be performed at a high speed (Application at page 15, lines 6-11).

Clearly, these features are not taught or suggested by Taylor. Indeed, Applicant summarizes some of the differences between Taylor and the claimed invention below.

1. Taylor does not teach or suggest a Q-value.

Indeed, the Examiner surprisingly attempts to equate the quantization level (QL) in Taylor with the "compression parameter" which includes a Q-value of the claimed invention. This is completely unreasonable. In fact, Applicant would note that the Application states that "[t]he Q-value is an image quality factor" (Application at page 1, lines 17-18). In contrast, the QL simply indicates a level of scaling of the DCT coefficients in JPEG. That is, the QL is not an image quality factor.

2. Taylor does not teach or suggest a "target bit rate".

The Examiner on page 4 of the Office Action surprisingly attempts to equate the

"compression ratio" in Taylor with the "bit rate" of the claimed invention. However, the "bit rate" in the claimed invention is actually given in the claim as "a ratio between data volume and the number of pixels of image data". In contrast, a compression ratio is commonly defined as the size of the original image divided by the size of the compressed image. That is, the compression ratio in Taylor is clearly not a "bit rate".

Indeed, this is made even more clear by considering Figure 4 of the present Application, which indicates that the Q-value (e.g., image quality factor) increases as the bit rate increases. However, it is well known that an increase in a compression ratio causes a decrease in image quality. Thus, it is clearly unreasonable for the Examiner to try to equate the compression ratio in Taylor with the "bit rate" of the claimed invention.

Moreover, even assuming (arguendo) that the compression ratio in Taylor would somehow be confused with a "bit rate", **nowhere does Taylor teach or suggest a "target" compression ratio.**

Indeed, nowhere does Taylor teach or suggest a "target bit rate". Taylor works to a "required image quality (PSNR)" and not a "target bit rate". In particular, Taylor states:

> *"For the required image quality (PSNR), and beginning with the largest VBS value (curr_VBS=8), the algorithm **identifies the quantization level (curr-QL) and compression ratio (curr_CR) used to satisfy the image quality constraint** by performing a lookup in the image quality parameters table"* (Taylor at page 1928, right column, second paragraph) (emphasis added).

That is, even assuming (arguendo) that the QL in Taylor would somehow be confused with the compression parameter (e.g., Q-value) of the claimed invention, Taylor teaches an algorithm in which the QL is selected to satisfy a "required image quality (PSNR)" and not a target bit rate.

Moreover, the Examiner does not identify where Taylor teaches a "target bit rate". Instead, the Examiner merely includes the comment that "(The target bit rate is that which falls within the wireless multimedia communication constrains (sic))". That is, nowhere does Taylor assign any significance to any particular bit rate. Instead, the Examiner assigns that significance himself.

3. Taylor does not teach or suggest the "compression characteristics data" of the claimed invention.

The claimed invention stores compression characteristics data which indicates compression characteristics (e.g., a relationship between the "bit rate" and a compression parameter (e.g., Q-value) of plural images having plural complexities, the compression characteristics. For example, Figure 4 of the present Application is a graph which plots the Q-value versus the bit rate for images of different complexities.

However, nowhere does Taylor teach or suggest any relationship between "bit rate" and a compression parameter of plural images having plural complexities. Instead, Taylor teaches a "precomputation step" in which "an average over a large number of images is used" to generate the table in Figure 7 (Taylor at page 1928, left column, first paragraph). That is, even assuming (arguendo) that Taylor teaches an "average image", Taylor teaches generating only data (e.g., the table of Figure 7) for that image.

That is, nowhere does Taylor teach or suggest storing data for "plural images having plural complexities" as in the claimed invention.

4. Taylor does not teach or suggest acquiring an initial compression parameter (e.g., an initial Q-value) based (in part) on a target bit rate.

The claimed invention acquires an initial compression parameter (e.g., an initial Q-value) based on compression characteristics data of an average image and a target bit rate. Nowhere is this taught or suggested by Taylor.

In fact, as noted above, the Examiner attempts to equate the quantization level (QL) in Taylor with the "compression parameter" (e.g., Q-value) of the claimed invention, and attempts to equate the compression ratio of Taylor with the "bit rate" of the claimed invention.

However, nowhere does Taylor even teach or suggest an "initial" QL. Indeed, Taylor teaches simply choosing "the image compression parameters which will minimize overall

energy consumption" by using the graph of Figure 8 and decreasing the VBS so that *"[i]f choosing the next smallest VBS will increase the overall energy consumption, or violate the latency or bandwidth constraints, then the current VBS is chosen*" (Taylor at page 1929, left column, first paragraph).

Therefore, Taylor certainly does not teach or suggest acquiring an initial QL based (in part) on a target compression ratio, which is the Examiner's position.

5. Taylor does not teach or suggest acquiring a corrective compression parameter (e.g., Q-value).

The claimed invention acquires a complexity of the image to be compressed (based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter), and acquires the corrective compression parameter based on that complexity and the target bit rate (e.g., see Application at Figure 4). Nowhere is this taught or suggested by Taylor.

Indeed, on page 4 of the Office Action, the Examiner surprisingly attempts to equate the PSNR in Taylor with the "complexity of the image" as in the claimed invention. However, the "complexity of the image" may be given as the relationship between a Q-value and "bit rate", and is, therefore, completely different from PSNR which Taylor equates with image quality (Taylor at page 1928, right column, second paragraph).

Moreover, even assuming (arguendo) that the PSNR in Taylor may be somehow confused with "complexity of an image", nowhere does Taylor teach or suggest acquiring a PSNR of the image to be compressed based on a compression ratio (which the Examiner incorrectly equates with a "bit rate" of the claimed invention) of compressed image data and an initial quantization level (which the Examiner incorrectly equates with the compression parameter of the claimed invention). Moreover, Taylor certainly does not teach or suggest acquiring a corrective QL based on the PSNR and a target compression ratio, as alleged by the Examiner.

Therefore, Taylor clearly does not teach or suggest the claimed invention. Indeed, Applicant respectfully submits that Taylor is completely unrelated to the claimed invention.

Therefore, Applicant submits that there are features of the claimed invention that are not taught or suggested by Taylor. Therefore, the Examiner is respectfully requested to

withdraw this rejection.

B. Kuniba, Yovanof and Maeda

The Examiner alleges that Taylor would have been combined with Kuniba to form the invention of claims 7 and 17, with Yovanof to form the invention of claim 18, and with Maeda to form the invention of claims 23-25. Applicant submits, however, that these alleged references would not have been combined and even if combined, the combination would not teach or suggest each and every feature of the claimed invention.

Kuniba discloses a data compression method which allegedly obtains a target scale factor NSF through a single trial (Kuniba at col. 2, lines 35-40).

Yovanof discloses a method for compressing an image which includes estimating a new Q-factor using a mathematical model based on an activity metric (A) of test images for a predetermined Q-factor value. (Yovanof at Figure 6).

Maeda discloses a method of image coding based on the target code length (Maeda at Abstract).

However, Applicant respectfully submits that these alleged references are unrelated. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the references provide no motivation or suggestion to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Taylor, nor Kuniba, nor Yovanof, nor Maeda, nor any alleged combination teaches or suggests acquiring a corrective compression parameter including *"wherein said acquiring said corrective compression parameter includes: acquiring from among said plural complexities, a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing said compression process, and said initial compression parameter; and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of said image to be*

compressed and the target bit rate, and wherein said initial and corrective compression parameters comprise a Q-value ", as recited, for example, in claim 1 (Application at Figures 3 and 4; page 13, line 10-page 15, line 4). As noted above, this may help to allow a compression process to be performed at a high speed (Application at page 15, lines 6-11).

Clearly, this novel feature is not taught or suggested by Kuniba.

Indeed, as noted above, Kuniba discloses a data compression method which allegedly obtains a target scale factor NSF through a single trial (Kuniba at col. 2, lines 35-40). Specifically, Kuniba deals with a quantization method (Kuniba at col. 12, lines 9-43), and has **nothing to do with acquiring a corrective compression parameter (e.g., Q-value).**

Therefore, Kuniba clearly does not teach or suggest acquiring the corrective compression parameter (e.g., Q-value) by acquiring from among the plural complexities a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter (e.g., Q-value), and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of the image to be compressed and the target bit rate, as in the claimed invention.

Likewise, Yovanof does not teach or suggest this feature of the claimed invention.

In fact, Yovanof simply teaches performing a calibration including calculating an activity metric (A) for test images at a predetermined Q-factor value, plotting the sample points (Q, A) and fitting the points with a mathematical model (Yovanof at col. 5, lines 28-67). Then Yovanof calculates (see Equation 2) an activity metric (A) that is based on N_B (number of blocks in the original image), Q_{init} (Q-factor used during first pass), q_{ij} (the unquantized DCT coefficient) and Q_{ij} (the (i,j)th entry in the Q-table) (Yovanof at col. 6, lines 20-59).

That is, nowhere does Yovanof teach or suggest acquiring a complexity of the image to be compressed (e.g., acquiring the function $Q=f_a(R)$ for the image to be compressed). Therefore, like Kuniba, Yovanof clearly does not teach or suggest acquiring the corrective compression parameter (e.g., Q-value) by acquiring from among the plural complexities a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter (e.g., Q-value), and acquiring from the compression characteristics data the corrective compression

parameter based on the acquired complexity of the image to be compressed and the target bit rate, as in the claimed invention.

Likewise, Maeda does not teach or suggest these features. Indeed, Maeda simply teaches an image processing apparatus which includes a region segmentation unit 102 which segments input image data into regions, and a limited color region coding unit 104 which encodes limited color regions of the segmented regions (Maeda at Figure 1; Abstract).

That is, Maeda does not even teach or suggest acquiring a complexity of the image to be compressed. Therefore, Maeda clearly does not teach or suggest acquiring the corrective compression parameter (e.g., Q-value) by acquiring from among the plural complexities a complexity of the image to be compressed based on a bit rate of compressed image data acquired in performing the compression process, and the initial compression parameter (e.g., Q-value), and acquiring from the compression characteristics data the corrective compression parameter based on the acquired complexity of the image to be compressed and the target bit rate, as in the claimed invention.

Thus, Kuniba, Yovanof and Maeda are unrelated to the claimed invention and do not make up for the deficiencies of Taylor.

Therefore, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every feature of the claimed invention. Therefore, Applicant respectfully requests that the Examiner withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-25, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 7/7/08

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing was filed by facsimile with the United States Patent and Trademark Office, Examiner Jose Torres, Group Art Unit # 2624 at fax number (571) 273-8300 this 7th day of July, 2008.

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